NASA TECHNICAL MEMORANDUM

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NASA WORK UNIT SYSTEM FILE MAINTENANCE MANUAL

NASA Headquarters
Washington, D.C. 20546

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16. Abstract

The NASA Work Unit System is a management information system for research tasks (i.e., work units) performed under NASA grants and contracts. It supplies profiles on research efforts and statistics on fund distribution. The file maintenance operator can add, delete and change records at a remote terminal or can submit punched cards to the computer room for batch update. The system is designed for file maintenance by a person with little or no knowledge of data processing techniques.

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PREFACE

The NASA Work Unit System resulted from a need for a management information and control system to facilitate planning, direction, and review of the supporting research programs monitored by the former NASA Office of Space Science and Applications (OSSA). By 1967-68 it had become evident that the attendant requirements for access to a large and ever-changing bank of data no longer could be met in a cost-effective manner by existing manual techniques.

The concept of a mechanized system was originated by Mr. Franklin G. Tate of the OSSA Program Support Branch. Working at first independently and then with the assistance of a contractor firm, Mr. Tate carried the idea through initial design, feasibility analysis, and implementation of a prototype system employing electronic accounting machine (EAM) equipment. After the feasibility had been demonstrated in 1969-70, work on the present system was started in the fall of 1970.

The current version, which was developed through the NASA Management Systems Office during 1971 and early 1972, utilizes interactive computer terminals in conjunction with time-sharing services as a means of more economically and effectively responding to the data processing requirements of the system.

Although further refinements are planned, the Work Unit System is an ongoing system that permits user offices to query or update files through remote terminals. Now serving both the Office of Space Science (OSS) and the Office of Applications (OA), the system provides needed support in the administration and review of research programs over which these two offices have cognizance. Its capabilities can be employed in connection with planning research programs, evaluating proposals, scheduling interviews, ensuring timely renewals or terminations, and accomplishing other activities related to program support.

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INTRODUCTION

The NASA Work Unit System is a basic management information system for research tasks (i.e., work units) performed under NASA grants and contracts. Although it deals with information on specific projects, its purpose is to provide management with broad overviews of research efforts in the aggregate. To do this, it supplies profiles to indicate how much effort is being devoted to what types of research, where the effort is being expended, and how funds are being distributed.

The system will permit a user to obtain information by entering requests on the keyboard of a time-sharing terminal. Answers are received in any of three forms:

- Displays shown on a video screen
- Messages typed automatically at the terminal
- Lists printed in the computer room and subsequently delivered by mail or messenger

The user needs neither data processing knowledge nor typing skill.

This manual explains how to add, delete, and change records either at the terminal or through punched cards submitted to the computer room. It assumes that the file maintenance operator has little or no knowledge of data processing procedures. Section 2 offers a brief summary of information about the system. Remaining sections of the manual delineate the information stored in each field of the Work Unit System record and explain how to enter it.

SECTION 2

ABOUT THE WORK UNIT SYSTEM

The NASA Work Unit System deals with administrative and funding information pertinent to research tasks. Each task is represented in the computer file by a separate record. The record format provides 29 fields in which various kinds of information can be stored. The fields and their contents are listed in Table 1.

Funding information (items 12 through 18 in Table 1) is supplied from files under the cognizance of the Headquarters Accounting Branch and the Agency Accounts and Reports Branch of the NASA Financial Management Division. Because this information is already in machine-readable form, it is not necessary for the file maintenance operator to key it again. At regular intervals the current information is transferred programmatically from the financial files to the Work Unit System files. Funding information for research tasks under the control of NASA Headquarters is extracted from files of the Financial Accounting System Teleprocessing (FAST).[1] Funding information for research programs under the control of installations is extracted from files of the Financial Status of Programs System (FSOP). At present, FAST figures are broken down to the detail level of individual tasks, but field installation figures are available only at the Research and Technology Operating Plan (RTOP) level. (Section 3.1 presents a discussion of RTOP's.)

The five-character codes shown in Table 1 represent the fields' names as far as the computer is concerned. The information stored in a field is referred to as the field value. In all communications with the system, the file maintenance operator will identify the fields by their codes. For example, if the file maintenance operator receives information that JQSMITH has replaced JPJONES as the principal investigator on a particular research task, he uses TASK# and PRINV to make the necessary change in

[1] Formerly Headquarters Financial Accounting System (HFAS).

Table 1. NASA Work Unit System Record Fields

Record Field	Content (Field Value)
1. TASK#	Task number
2. PRINV	Principal investigator
3. MONIT	NASA monitor
4. INAME	Institution name (i.e., performing institution)
5. CONT#	Contract number
6. ICITY	Institution city
7. ISTAT	Institution state
8. SDATE	Starting date
9. ADATE	Anniversary date
10. CDATE	Commitment date
11. ODATE	Obligation date
12. CY-3$	Obligated funds for the fiscal year 3 years ago
13. CY-2$	Obligated funds for the fiscal year 2 years ago
14. CY-1$	Obligated funds for the last fiscal year
15. CPLN$	Planned funds for the current fiscal year
16. CCOM$	Committed funds for the current fiscal year
17. COBL$	Obligated funds for the current fiscal year
18. BDYR$	Planned funds for the budget year (i.e., next fiscal year).
19. INCAT	Institution category (university, industrial, etc.)
20. STATU	Status code for the task (for the 5 years of Fields 12-18)
21. ICODE	Institution code (identifying code for the institution)
22. SIGAU	Signature authority
23. SUPRQ	Support required (balloon, aircraft, etc.)
24. ACTI%	Activity percentages (theory, data reduction, etc.)
25. WRKSP	Work support (automated, manned, etc.)
26. SCDIS	Scientific discipline
27. TITLE	Task title
28. DBSCD	Data base code
29. PSDCD	Division pseudocode

the record. Using TASK# and the number of the research task to identify the record he wants to change, he then uses PRINV to indicate the field in which the change is to be made. The following extract from the terminal dialogue indicates how this takes place:

System: DO YOU WANT TO CHANGE A FIELD VALUE?
INPUT Y OR N

Operator: Y

System: INPUT THE NAME OF THE FIELD
TO BE INVOLVED IN THE REPLACEMENT.
?

Operator: PRINV

System: PRINV = ?

Operator: JQSMITH

The entry JQSMITH by the operator will automatically delete whatever is in the PRINV field (in this case JPJONES) and replace it with JQSMITH. If the field is vacant, the operator's entry will replace the vacancy.

The dialogue from which the above exchange was extracted is one of three basic file update dialogues in the NASA Work Unit System. All three consist of straightforward questions and answers. In addition to the above, which is utilized for changing a record, there is a dialogue for adding a new record and one for deleting a record.

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SECTION 3
CONTENTS OF THE RECORD

3.1 Task Number (TASK#)

The NASA research task number is an 11-digit code in the form ABC-DE-FG-HI-JK. The segments not only identify a specific task, but indicate its subject area and the NASA installation having cognizance over it. The subject matter is represented by the seven-digit segment ABC-DE-FG, known as the RTOP number. An RTOP is a Research and Technology Operating Plan, delineated on a NASA Form 1471, that represents an effort directed toward a particular goal. The digits in the HI position represent the sequential number for an individual task under a particular RTOP, and those in the JK position identify the cognizant installation. As an example, Task 160-44-51-09-51 thus can be interpreted as follows:

Segment	Meaning
160-44-51	RTOP number (optimum remote sensing techniques for meteorology)
09	Task number 09 for RTOP 160-44-51
51	Goddard Space Flight Center

The numbering system for the RTOP's conforms to the NASA Agency-Wide Coding Structure, for which NASA Financial Management Manual 9100 is a prime information source. Figure 1, a representation of the manual that contains 160-44-51, illustrates the classification scheme. Table 2, extracted from another page in the same manual, lists the code numbers for the various installations.

3.2 Principal Investigator (PRINV)

The principal investigator's name is entered with initials first, surname last, no punctuation, and no spaces. Thus J. Q. Smith will appear as JQSMITH. With one initial, the form is J SMITH (with a space).

Coding for R&D and R&PM Appropriations			FMM 9130-101
Office of Application			
Code (Digits)			
Unique Project	System or SRT	Subsidiary Breaks	
123	45	67	Nomenclature
160	00	00	Earth Observations SR&T
	20	00	Technology
		51	S/C Systems and Technology
		52	Data Management and Storage
		53	Visible and IR Sensor Technology
		54	MW & MM Wave Radiometer Sys Dev
		55	Cooling Systems
		56	Air Pollution Sensing
		57	Chem & Spectro Stdy-Air Pollution
		58	Adv. Sensor Feasibility
		59	High Speed Interferometer Exp Dev
	44	00	Meteorology
		51	Optim Remot Sens Techs for Met
		52	Appl Met Sat Data to Gen Circ Met
		53	Rem Sens Tech-Cld Struc/Prec/Su
		54	Rad Trans Mod/Atmos & Surf Char
		55	Anal Energ Interact Bet Atmos L
		56	Lab & Fld Exp & Calif & Radia S
		57	Airborne Meteorology Program
		58	Climatol Mod of Atmos & Cloud C
		59	Atmos Transmit for 4.3 & 15 Mic
		60	Atmos Effects Upon Remote Sens
		62	Util Apollo Phot for Mesoscale
	75	00	Earth Resources
		50	Earth Res Sens Instrumentation
		51	Earth Res Multichan Surf Sens
		52	Data Mgmt Info Extr & Proc Inst
		53	Manip, Valid & Record Image Data
		54	Earth Res Studies with Nimbus
		56	Hardware for A/C & S/C Acquired
		57	Earth Resources Sensing Instrum
		58	U/Michigan Special Competence Gro
		59	U/Kansas Special Competence Gro
		60	Midwest/Great Lakes Appl of Eo
		61	Earth Res Data Anal Instrtn &
		65	Agr & For Remot Sens Res & Tech
		66	Spacecraft Oceanography Project
		67	Oceanography Studies (ESSA)
		68	Hydrology Studies (ESSA)
		69	Geologic Remote Sensing Program
		70	Hydrology, USDI
		71	Urb & Region Chng Det & Pred (G)

Figure 1. RTOP Numbers from Agency-Wide Coding Structure

Table 2. NASA Installation Codes

Code	Installation
10	NASA Headquarters
15	Mission Analysis Division (for reporting purposes only)
21	Ames Research Center
22	Lewis Research Center
23	Langley Research Center
24	Flight Research Center
42	Space Nuclear Propulsion Office/Cleveland
44	Space Nuclear Propulsion Office/Nevada
45	Space Nuclear Propulsion Office/Washington, D.C.
51	Goddard Space Flight Center
53	Wallops Station
55	Jet Propulsion Laboratory (for reporting purposes only)
56	NASA Pasadena Office (for reporting purposes only)
62	Marshall Spaceflight Center
72	Manned Spacecraft Center
76	John F. Kennedy Space Center

3.3 NASA Monitor (MONIT)

The name of the individual with monitoring responsibility is entered in a form identical to that used for the principal investigator's name.

3.4 Institution Name (INAME)

The institution, as treated in the Work Unit System, is the organization responsible for the execution of the task. It can be a NASA installation, a contractor organization, or a grantee organization.

Standardization of institution names is provided editorially through a master list. A copy of this list at the terminal will permit the user to determine the exact character-by-character form in which a name has been entered on the file. When querying on an institution name the user must key the name exactly as it appears on the file. The program simply matches names. Thus, if the user deviates even by so little as a space or a punctuation mark, the system will be unable to match his keyed message and will report that the requested item is not on the file.

3.5 Contract Number (CONT#)

For all practical purposes, the contract number and the grant number are equivalent in this field. The number of the contract instrument, whether it is a contract or a grant, appears in this field.

3.6 Institution City (ICITY)

The name of the city where the performing institution's principal office is located is contained in this field. It usually corresponds to the one referred to in some NASA systems as the place-of-performance (POP) city.

3.7 Institution State (ISTATE)

This field contains the State in which the above city is located. Since there are only five character positions in the field, the State name is usually abbreviated.

3.8 Starting Date (SDATE)

The task starting date (month and year) is entered in the form MMYY. (For example, January 1973 is entered as 0173).

3.9 Anniversary Date (ADATE)

The anniversary date, which is entered as MMYY, is the expiration date of the grant or the equivalent thereof. In general, it is the date when appropriate action will be required to review or extend a task.

3.10 Commitment Date (CDATE)

The date when procurement funds were committed is entered as MMYY.

3.11 Obligation Date (ODATE)

The obligation date (equivalent to the date of award of the most recent contract or grant) is entered as MMYY.

3.12 Obligated Funds Three Years Ago (CY-3$)

The total funding obligated for this task for the fiscal year 3 years ago is entered in thousands of dollars.

3.13 Obligated Funds Two Years Ago (CY-2$)

This field contains obligated funding as described for Field 12 (CY-3$), but for the fiscal year 2 years ago.

3.14 Obligated Funds One Year Ago (CY-1$)

This field contains obligated funding as described for Field 12 (CY-3$), but for the immediate past fiscal year.

3.15 Funds Planned for the Current Fiscal Year (CPLN$)

Funding planned is defined as estimated funding for which procurement has not yet been initiated. Figures are entered in thousands of dollars.

3.16 Funds Committed for the Current Fiscal Year (CCOM$)

Funding approved, but not yet represented by a grant or negotiated contract, is entered in thousands of dollars.

3.17 Funds Obligated for the Current Fiscal Year (COBL$)

The dollar value of the grant or contract is rounded to the nearest number of thousands if necessary.

3.18 Funds Planned for Budget Year (BDYR$)

Planned funding, as defined above, is entered in thousands of dollars. The budget year is defined as the fiscal year immediately following the current one.

3.19 Institution Category (INCAT)

The information in this field is coded according to the following:

- UV = University
- UM = University medical school
- NP = Nonprofit
- IN = Industrial
- FC = Field center
- OT = Other

3.20 Status Code (STATU)

There are three status codes:

- C = Continuing research
- N = New research
- F = Completed research

This field has five character positions, one for each of the past 3 fiscal years, one for the current fiscal year, and one for the upcoming fiscal year. One of the above three letters is entered in each of the five positions. An example might be: NCCCF. If the task did not exist in any particular year, that position is left blank. A blank field is represented by an asterisk in a terminal display.

3.21 Institution Code (ICODE)

The master list giving the authorized forms for institution names also gives an alphanumeric code for each one. This code contains six characters. For example, the code for the University of Nevada is U83100. The reason for the two fields is one of access expediency. It is considered easier for the user to search on the actual name in Field 4 when entering a query; but it is easier for the computer to manipulate the code when extracting and sorting data for reports or lists.

3.22 Signature Authority (SIGAU)

This field is intended to accommodate a figure representing the dollar level of authority delegated to the division director by the associate administrator.

3.23 Support Required (SUPRQ)

The following five codes are used for support:

- B = Balloons
- A = Aircraft
- R = Rockets

- O = Other
- N = None

Because more than one type of support may be required for a task, this field will accommodate multiple entries. For display purposes the terminal provides a formatted B-A-R-O-N message, in which an X represents an entry and an asterisk represents a blank. For example:

* - * - X - * - *

The presence of the X in the third (i.e., R) position indicates that rockets are required to support this task. The purpose of this field is to provide an alerting tool. The Work Unit System flags the need for such itmes as baloons or rockets to enable the user to investigate and take appropriate action to provide them.

3.24 Activity Percentages (ACTI%)

This field provides 10 character positions, two for each of the following:

- Theory
- Instrumentation development
- Data reduction
- Ground research
- Program support

For example, if a task is 20 percent theory, 50 percent instrumentation development, and 30 percent data reduction, the terminal will display the following message:

20-50-30-

3.25 Work Support (WRKSP)

This field will contain one character representing a subjective decision by the NASA monitor as to what part of the NASA program this task supports. The possible characters are:

- A = Automated (i.e., unmanned)
- M = Manned
- B = Both

3.26 Scientific Discipline (SCDIS)

A three-letter code is entered in this field to signify the scientific discipline that encompasses the task. The codes and the disciplines they represent are listed below:

Code	Discipline
MAL	Lunar physics--geodesy and cartography
ECC	Communications satellite technology
ECE	Advanced systems--communications
ECF	Advanced programs and technical communications
ECM	Data collection
ECN	Navigation and traffic control
ECP	Interdisciplinary applications
ECS	Applications technology
ERF	Earth observation technology
ERG	Earth physics
ERM	Meteorology
ERP	Interdisciplinary--earth resources
ERR	Earth resources
SGA	Astronomy
SGE	Interdisciplinary--space science
SGI	Magnetospheric physics
SGM	Interplanetary dust and cometary physics
SGP	High-energy astrophysics

Code	Discipline
SGS	Solar physics
SGT	Advanced technological development
SLA	Planetary atmospheres
SLB	Planetary biology
SLD	Advanced technical development
SLP	Interdisciplinary--planetary
SLQ	Planetary quarentine
SLR	Planetology
SLT	Planetary astronomy
SVA	Advanced studies--launch vehicles
SVG	Guidance--launch vehicles
SVI	Instrumentation--launch vehicles
SVP	Propulsion--launch vehicles
SVS	Structures and materials--launch vehicles
SVV	Launch vehicles studies

3.27 Task Title (TITLE)

The record provides up to 130 character spaces (characters or blanks) for the title. The field actually contains three line segments of 50, 50, and 30 characters respectively.

3.28 Data Base Code (DBSCD)

Each of the system's files (the OSS file and the OA file) really represents seven subfiles, one for each of the following:

- 1 = Supporting research and technology (SR&T)
- 2 = Data analysis
- 3 = Advanced studies

- 4 = Institutional
- 5 = Sounding rockets
- 6 = Manned spaceflight experiment development
- 7 = Other

Although the system's records could be broken down into seven separate files for OSS and seven for OA, it is more convenient to group them together and provide a one-character position identifying the subfile (or data base).

The user will discover that each report or list produced by the system represents only the tasks for one of these seven data bases. On a report or list, the data base is identified in the top lefthand corner by the name of the data base from which it was extracted.

The query program, on the other hand, addresses an entire file (OSS or OA). In the display provided for a query, the data base is identified in the lower righthand corner by the number. For example, a 3 in this position indicates that the task represents an advanced study.

3.29 Division Pseudocode (PSDCD)

Currently there are six divisions represented in this field. Two of them are now represented only in the OA file; the rest are represented only in the OSS file. In the original integrated OSSA file the six divisions were assigned simple numeric codes. When the OSSA file was divided, the original codes were retained for purposes of system efficiency. Following are the numeric codes along with the names and file assignments of the divisions:

- 1 = Apollo exploration (OSS)
- 2 = Communications (OA)
- 3 = Earth observations (OA)
- 4 = Launch vehicles (OSS)

- 5 = Physics and astronomy (OSS)
- 6 = Planetary (OSS)

As in the case of the data base code, the name of the division appears in a report or list, and the code number appears in a terminal display.

SECTION 4
ADDING A NEW RECORD THROUGH THE TERMINAL

4.1 How the Add Function Works

The NASA Work Unit System permits the operator to add a complete new record to the file by means of a dialogue procedure at the terminal. If the terminal is not in use at the time, the operator activates it and proceeds through the sign-on routine described in the NASA Work Unit System User's Manual carrying it to the point at which the system asks the FUNCTION question:

FUNCTION (Q, A, D, OR E)?

Answering this question with A (for ADD) will initiate the process. If the operator is already using the terminal to make changes in field values, he can add a new record by answering A to the FUNCTION question whenever it appears at the terminal. As explained in the User's Manual, this question is always presented to the operator as soon as he turns down an opportunity to see a record display or to change a field name.

When the operator inputs the A, the system immediately begins to guide him through the process by asking him to supply the values of the various fields. The dialogue looks like this:

System: FUNCTION (Q, A, D, OR E)?

Operator: A

System: Task# = ?

Operator: 87911411810

System: PRINV = ?

Operator: JQSMITH

The process continues in this manner through all of the 29 fields accommodated by the record. The system asks the questions in the order in which these fields are named in Table 1, using the five-character codes to identify them.

The system will hold a question at the terminal until the operator strikes the carriage return key, at which time it will present the next question. Therefore, if there is no information available to enter in a particular field, the operator simply strikes the carriage return key.

Presumably the operator obtains the information from a NASA Form T8 or its equivalent. The Form T8, Research and Technology Resume, is reproduced as Figure 2. As the questions are asked at the terminal, the operator obtains the answers from a completed T8 and enters the information on the terminal keyboard. Before attempting to add a record, the operator should study Section 3 again to ensure the use of correct rules when entering data.

4.2 Notification of Operator Error

The system is programmed to prevent certain errors by notifying the operator through messages at the terminal. These messages are designed to guide the operator in correcting his errors. Usually the system indicates the nature of an error and then returns to the preceding question to allow the operator to answer it correctly. A few examples here will serve to indicate how the notification system works.

When the operator indicates his intention to add a new record to the file (by answering A to the FUNCTION question), the system sets up a verification routine to prevent him from duplicating a record already on the file. As soon as he enters the task number, the system searches for that number in the file. If a record already exists for that task number, the system displays the following message:

```
RECORD ALREADY ON FILE
FUNCTION (Q, A, D, OR E)?
?
```

The operator then can check to see if he has copied the number incorrectly. If so, he can answer with A, receive the TASK# question again, and enter the correct number. If not, he can answer Q, call for the existing record

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

RESEARCH AND TECHNOLOGY RESUME

1. DATE PREPARED	2. PRIOR NUMBER/CODE	3. CURRENT NUMBER/CODE
4. TITLE		
5. PERFORMING ORGANIZATION		8. CONTRACT/GRANT NO.
		9. STARTING DATE / 10. ANNIVERSARY DATE
6. INVESTIGATOR'S NAME	TELEPHONE NO.	11. FUNDING (In K) / 12. STATUS
		PRIOR FY
		CURRENT FY
7. NASA TECHNICAL MONITOR'S NAME	TELEPHONE NO.	BUDGET FY
		13. INSTITUTION CATEGORY

14. SUPPORT REQUIRED	15. ACTIVITY PERCENT				
	THEORY	INSTRUMENT DEV.	DATA REDUCTION	GROUND RESEARCH	SUPPORT

16. DESCRIPTION

FOR HEADQUARTERS USE ONLY

17. INSTITUTION CODE	18. SIGNATURE AUTHORITY	19. WORK SUPPORT	20. DISCIPLINE

NASA FORM T8 JAN 72 REPLACES NASA FORM T8 WHICH IS OBSOLETE.

Figure 2. NASA Form T8, Research and Technology Résumé

under that task number, and compare the display to the complete record he was about to enter.

If, when adding a record to the file, the operator accidentally strikes the carriage return, the system will display:

```
BLANK TASK#'S ARE NOT ALLOWED
TASK# = ?
```

In this case he simply enters the correct task number, depresses the carriage return key, and goes on to the next question. However, if he hits the carriage return key prematurely when he is summoning a record for the purpose of changing its contents, the following message will be displayed:

```
BLANK TASK#'S ARE NOT ALLOWED
FUNCTION (Q, A, D, OR E)?
?
```

This requires the operator to begin his query routine again by answering Q, identifying the task number field as the search field, and keying in the correct number in response to the TASK# question.

If the operator makes an error in the task number when summoning a record to make a change, the system will respond in one of two ways. If the incorrect task number duplicates one for a record already on file, the system will simply display the existing record. If the task number is not represented on the file, the system will display the following message:

```
THE DESIRED RECORD WAS NOT FOUND ON FILE
FUNCTION (Q, A, D, OR E)?
?
```

Here again, the operator must reenter Q and answer the next two questions correctly to reinitiate the process.

SECTION 5
DELETING A RECORD THROUGH THE TERMINAL

The deletion of a record is a very short process. It requires the operator to bring the dialogue to the FUNCTION question by any of the means previously discussed. The operator then answers D, the system asks "TASK# = ?," and the operator replies with the task number. If the task number is represented by an existing record, the system displays the message SUCCESSFUL and returns to the FUNCTION question.

In the question of when to delete, the operator must be guided by the circumstances. For example, if the operator discovers an error in the task number or in one of the other fields entered early in the process of adding a new record, it might be simpler to delete the entire record and start over again. On the other hand, if a record is substantially correct except for one field, or even for a few fields, it might be less time-consuming to exercise the change capability for each of the defective fields. The change procedure is discussed in Section 6.

SECTION 6

CHANGING AN EXISTING RECORD

In Section 2, the change capability of the Work Unit System was used to illustrate the type of dialogue used for file maintenance. In this section the complete dialogue will be discussed, from sign-on to sign-off. It is assumed that the file maintenance operator has already reviewed the NASA Work Unit System User's Manual (particularly subsection 4.1 on terminal equipment), and has become familiar with the operation of the devices installed at his own work location.

A file maintenance session at the terminal begins with the same sign-on routine as that used for a query session:

System: U#=

Operator: RES99999

System: Resource ID-

User: (The user enters the resource identification number, which will be furnished to him through administrative channels. The system then will display a string of characters resembling strikeovers. When this string has been generated by the system, the user enters the password, which also will be furnished to him through administrative channels. He will not be able to read the password because it will be printed over the line of "garbage" just generated by the system for security purposes.)

System : SYSTEM?

Operator: Card

System: OLD OR NEW-

Operator: OLD OSSQ

(This will summon the OSS file for querying or updating. In this case, the file is to be used for updating purposes. If the operator wishes to update the OA file he enters OLD OAQ).

System: READY

Operator: RUN

System: FUNCTION (Q, A, D, OR E)?

Operator: Q

It may appear strange that the Q instruction is employed here; however, the procedure for making changes to records is actually a subset of the query procedure. This permits the operator to display and examine the record to be changed before proceeding with the changes. After a record has been displayed, the system always asks the user if he wants to change the value of a field. In the user's manual referenced above, the user is instructed always to answer this question in the negative. However, the question is put there for the use of the file maintenance operator, who will always answer in the affirmative. After the operator has entered the Q instruction, the dialogue proceeds as follows:

System: ENTER NAME OF SEARCH FIELD

Operator : TASK#

System : ENTER SEARCH FIELD VALUE
?

Operator: 19255632210

(Even though NASA task numbers contain hyphens in displays, the operator omits the hyphens and closes the spaces when entering a task number at the terminal.)

System: WOULD YOU LIKE DISPLAY OF RECORD?
INPUT Y OR N

Operator : Y

System: WANT HEADING?

Operator: Y

(At this point the system will display the standard heading with the record for Task No. 192-55-63-22-10 right below it. An example of such a display appears in Figure 2 of the system user's manual. If the

operator feels that he need not see the heading, nor even the record itself, he can answer N to either question.)

System: DO YOU WANT TO CHANGE A FIELD VALUE?
INPUT Y OR N
?

Operator: Y

(It is at this place that the dialogue for changing a record breaks off from the dialogue for entering a query.)

System: INPUT THE NAME OF THE FIELD
TO BE INVOLVED IN THE REPLACEMENT.
?

Operator: PRINV

System: PRINV = ?

Operator: JQSMITH

System: WOULD YOU LIKE TO CHANGE ANOTHER FIELD
VALUE IN THE SAME RECORD?
INPUT Y OR N

Operator: Y

System: INPUT THE NAME OF THE FIELD TO BE INVOLVED
IN THE REPLACEMENT.
?

Operator: SDATE

System: SDATE = ?

Operator: 0172

System: WOULD YOU LIKE TO CHANGE ANOTHER FIELD
VALUE IN THE SAME RECORD?
INPUT Y OR N

Operator: N

System: WOULD YOU LIKE DISPLAY OF RECORD?
INPUT Y OR N

Operator: Y

System : WANT HEADING?

Operator: Y

System: (Displays heading and revised record.)

System: FUNCTION (Q, A, D, OR E)?

It can be seem from the foregoing that every yes or no response by the operator affects the course of the remaining dialogue. The system will continue to offer to change other fields as long as the operator enters yes; but as soon as he answers no, the system offers him a chance to examine the record he has just changed and to verify the alterations. If he elects to examine the record, the system offers him the option of including the heading.

Whenever the operator decides to say no to one of these questions, the system jumps immediately to the FUNCTION question. Thus the operator can accelerate his work, if necessary, by answering no to the another-field question and dispensing with the display. This option can be exercised effectively if the dialogue is being recorded on the terminal printer for subsequent proofreading.

SECTION 7
PUNCHED CARDS USED FOR FILE CHANGES

7.1 Use of Punched Cards

All of the updating functions described in Sections 4, 5, and 6 can be accomplished by submitting punched cards to the computer room for batch processing. Because the Work Unit System is designed primarily for operation through remote terminals, the use of punched cards is considered an alternative to which the file maintenance operator may resort only when he has a large number of transactions to be entered. Nevertheless, when the circumstances so dictate, the operator should know how cards are to be prepared on a keypunch.

Punched cards can be used to add a new record to the file, to delete a record from the file, to change the value of any field other than the task number, and to change a task number. The task number change is mentioned specifically because changing the value of this particular field requires a different procedure when accomplished through punched cards. This procedure is discussed more fully in subsection 7.5, Task Number Changes.

Each card is punched according to a prescribed format, regardless of function (i.e., addition, deletion, or change). Certain information is entered in certain columns on every card as follows:

Column	Content
1-11	Task number (referred to as Current Number/Code in block 3 of Form T8)
12	Card number (1, 2, 3, 4, or 5)
13-77	Data (field values, etc.)
78-79	Card ID (always T3 in this system)
80	Type of change (A, D, C, or T) .

The card number referred to above is a sequence number, the use of which is explained in subsection 7.2, Adding a Record. The change types are A for ADD, D for DELETE, C for CHANGE other than task number, and T for TASK NUMBER change. The application of this standard format to each of the four kinds of file change is discussed below in subsections 7.2 through 7.5.

7.2 Adding a Record

The biggest single transaction is adding a complete new record to the file. This requires five separate cards. Each card contains the task number in columns 1 through 11, the card identification T3 in columns 78 and 79, and the code A in column 80. The five cards are distinguished from each other by the number 1, 2, 3, 4, or 5 punched in column 12. Field values (other than the task number) are punched in columns 13 through 77. Each of the cards contains different field values as indicated below:

- Card 1: First 65 characters of the title. If the title requires less than 65 characters, the complete title goes in Card 1.
- Card 2: Balance of the title. If the title contains more than 130 characters, the first 65 go in Card 1, the next 65 go in Card 2, and the remaining characters are not entered in the record at all. If the complete title fits in Card 1, no Card 2 is punched.
- Card 3:
  - -- Performing organization, from block 5 of Form T8
  - -- Performing organization city, from block 5 of Form T8
- Card 4:
  - -- Investigator's first initial
  - -- Investigator's second initial, if any
  - -- Investigator's last name
  - -- NASA monitor's first initial
  - -- NASA monitor's second initial, if any

-- NASA monitor's last name

-- Contract/Grant number

-- Start date in MMYY format (i.e., June 1973 = 0673)

-- Anniversary date in MMYY format

-- Funding prior FY

-- Status code prior FY

- Card 5:

-- Funding current FY

-- Status code current FY

-- Funding budget FY

-- Status code budget FY

-- Institution category

-- Support required

-- Activity percent theory

-- Activity percent instrumentation development

-- Activity percent data reduction

-- Activity percent ground research

-- Activity percent support

-- Institution code

-- Signature authority

-- Work support

-- Discipline

Each of the above elements has a special card location. The complete keypunching instructions contained in Section 8 provide information on where to find the data in the various blocks of NASA Form T8, what columns to use for the various items, and how to enter them.

7.3 Deleting a Record

Only one card is required for deleting a task number record. The card contains the task number in columns 1 through 11, the constant T3 in columns 78 through 79, and the D (for DELETE) in column 80.

Some of the records in the file represent RTOP's rather than tasks. The card for deleting an RTOP differs slightly from the deletion card for a task number, because the "task number" for an RTOP contains zeros for the eighth and ninth characters. Thus, the first 11 columns on the deletion card must contain the RTOP number in columns 1 through 7, zeros in columns 8 and 9, and the installation code in columns 10 and 11.

7.4 Field Value Changes Other Than Task Numbers

To make a change in one field, it is necessary to prepare only the one card (Card 1, 2, 3, 4, or 5) on which space is reserved for that particular field. The new value is punched in the appropriate columns of the card, and the system replaces the existing information for that field with that punched in the card. For example, to add JQSMITH as a principal investigator, or to replace some other name with JQSMITH, it is necessary to prepare a Card 4 containing the task number in columns 1 through 11, a 4 in column 12, the JQSMITH in columns 13 through 19, the constant T3 in columns 78 and 79 and a C (for CHANGE) in column 80.

It should be noted that the discussion above refers to the entry of JQSMITH in columns 13 through 19, whereas the keypunch instructions in the appendix indicate that columns 13 through 29 are reserved for this purpose. Whenever the information to be added does not fill all the reserved columns, the unused spaces are to be left blank.

7.5 Task Number Changes

The card required to change a task number looks like a deletion card except that the new task number goes in columns 13 through 23 and a T (for TASK NUMBER CHANGE) goes in column 80. It is not possible to make both a task number change and a change in one of the other field values

at the same time. If such a situation should arise, it is necessary to delete the old record entirely with a D card and make a set of A cards to enter a new record. The A cards must contain not only the new field values, but also those that were in the old record originally. If a revised Form T8 is not available at the time, it is a good procedure to secure a display of the existing record with the query routine and make a terminal print of the display for use in preparing the A cards. This should be accomplished before the D card is entered; otherwise the data will be lost.

If it is necessary to change two fields that are both handled on the same card, a new card need not be prepared for each change. For example, both the investigator's name and the NASA monitor's name are punched in Card 4. Therefore, one Card 4 will suffice for changing both the investigator and the monitor for a particular task.

KEYPUNCH OPERATOR INSTRUCTIONS

1 SUBSYSTEM TITLE	2 PROGRAM IDENTIFICATION
Work Unit System (OSS & OA) Regular Change and Addition Card #1	
3 SOURCE DOCUMENT	**4 OPERATION**
Research and Technology Resume	KP/KV

5 DESCRIPTION

ITEM NO. a	CARD COLUMNS FROM b	CARD COLUMNS TO c	ITEM NAME d	EXPLICIT INSTRUCTIONS e
1.	1	11	Current Number/Code (Source is Block #3)	Eleven digits numeric; do not punch punctuation.
2.	12	12	Card Number	Punch numeric 1.
3.	13	77	Title (Source is Block #1)	Punch as shown. If title is more than 65 characters continue on Card #2.
4.	78	79	Card-Id	Punch "T3."
5.	80	80	Action Code	Punch either "A" or "C;" proper code will be indicated by special instruction.

KEYPUNCH OPERATOR INSTRUCTIONS

1 SUBSYSTEM TITLE	2 PROGRAM IDENTIFICATION
Work Unit System (OSS & OA) Regular Change and Addition Card #2	
3 SOURCE DOCUMENT	**4 OPERATION**
Research and Technology Resume	KP/KV

5 DESCRIPTION

ITEM NO. a	CARD COLUMNS FROM b	CARD COLUMNS TO c	ITEM NAME d	EXPLICIT INSTRUCTIONS e
1.	1	11	Current Number/Code	Follow instructions for Field #1, Card #1.
2.	12	12	Card Number	Punch numeric 2.
3.	13	77	Title (Source is Block #4)	Continue remainder of title from Card #1; if more than 65 characters, ignore overage.
4.	78	79	Card-Id	Punch "T3."
5.	80	80	Action-Code	Follow instructions for Card #1, Field #5.

KEYPUNCH OPERATOR INSTRUCTIONS

1 SUBSYSTEM TITLE	2 PROGRAM IDENTIFICATION
Work Unit System (OSS & OA) Regular Change and Addition Card #3	
3 SOURCE DOCUMENT	**4 OPERATION**
Research and Technology Resume	KP/KV

5 DESCRIPTION

ITEM NO. a	CARD COLUMNS FROM b	CARD COLUMNS TO c	ITEM NAME d	EXPLICIT INSTRUCTIONS e
1.	1	11	Current Number/Code	Follow instructions for Card #1, Field #1.
2.	12	12	Card Number	Punch numeric 3.
3.	13	52	Performing Organi-zation Name (Source is Block #5)	Punch as shown; left justify; ignore any overage.
4.	53	72	Performing Organi-zation City (Source is Block #5)	Punch as shown; left justify; ignore any overage.
5.	73	77	Performing Organi-zation State (Source is Block #5)	Punch as shown unless not abbreviated, then use common abbreviations; left justify.
6.	78	79	Card-Id	Punch "T3."
7.	80	80	Action Code	Follow instructions for Card #1, Field #5.

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KEYPUNCH OPERATOR INSTRUCTIONS

1 SUBSYSTEM TITLE	2 PROGRAM IDENTIFICATION
Work Unit System (OSS & OA) Regular Change and Addition Card #5	
3 SOURCE DOCUMENT	**4 OPERATION**
Research and Technology Resume	KP/KV

5 DESCRIPTION

ITEM NO. a	CARD COLUMNS FROM b	CARD COLUMNS TO c	ITEM NAME d	EXPLICIT INSTRUCTIONS e
1.	1	11	Current Number/Code	Follow instructions for Card #1, Field #1
2.	12	12	Card Number	Punch numeric 5.
3.	13	19	Funding Current FY. (Source is Block #11)	Punch 7 numeric; right justify; zero fill.
4.	20	20	Status Current FY (Source is Block #12)	Punch 1 alpha as shown; skip if blank.
5.	21	27	Funding Budget FY (Source is Block #11)	Punch 7 numeric; right justify; zero fill.
6.	28	28	Status Budget FY (Source is Block #12)	Punch 1 alpha as shown; skip if blank.
7.	29	30	Institution Category (Source is Block #13)	Punch alpha as shown.
8.	31	34	Support Required (Source is Block #14)	Punch as shown; maximum of 4 alpha; left justify.
9.	35	36	Activity Percent-Theory (Block #15)	Punch 2 numeric; right justify; zero fill; skip if blank. If "100" indicated, punch 99.
10.	37	38	Activity Percent-Instrument Dev. (Block #15)	Same logic as Field #9.
11.	39	40	Activity Percent-Data Reduction (Block #15)	Same logic as Field #9.

KEYPUNCH OPERATOR INSTRUCTIONS

1 SUBSYSTEM TITLE	2 PROGRAM IDENTIFICATION
Work Unit System (OSS & OA) Regular Change and Addition Card #5	
3 SOURCE DOCUMENT	**4 OPERATION**
Research and Technology Resume	KP/KV

5 DESCRIPTION

ITEM NO. a	CARD COLUMNS FROM b	CARD COLUMNS TO c	ITEM NAME d	EXPLICIT INSTRUCTIONS e
12.	41	42	Activity Percent-Ground Research (Block #15)	Same logic as Field #9.
13.	43	44	Activity Percent-Support (Block #15)	Same logic as Field #9.
14.	45	51	Institution Code (Source is Block #17)	Punch maximum of 7 alpha numeric; left justify.
15.	52	56	Signature Authority (Block #18)	Punch as shown; right justify; may be blank.
16.	57	57	Work Support (Block #19)	Punch 1 alpha as shown; may be blank.
17.	58	60	Discipline (Block #20)	Punch 3 alpha, as shown; left justify.
18.	61	77	Skip	Skip.
19.	78	79	Card ID	Punch "T3."
20.	80	80	Action Code	Follow instructions for Card #1, Field #5.

KEYPUNCH OPERATOR INSTRUCTIONS

1 SUBSYSTEM TITLE	2 PROGRAM IDENTIFICATION
Work Unit System (OSS & OA) Task and RTOP Deletion Cards	

3 SOURCE DOCUMENT	4 OPERATION
Loading Forms	KP/KV

5 DESCRIPTION

ITEM NO. a	CARD COLUMNS FROM b	CARD COLUMNS TO c	ITEM NAME d	EXPLICIT INSTRUCTIONS e
1.	1	11	Task Number	Punch 11 numeric; left justify; no punctuation.
2.	12	77	Skip	Skip.
3.	78	79	Card ID	Punch "T3."
4.	80	80	Action Code	Punch "D."

KEYPUNCH OPERATOR INSTRUCTIONS

1 SUBSYSTEM TITLE	2 PROGRAM IDENTIFICATION
Work Unit System (OSS & OA) Task # Change Cards	
3 SOURCE DOCUMENT	**4 OPERATION**
Loading Forms	KP/KV

5 DESCRIPTION

ITEM NO. a	CARD COLUMNS FROM b	CARD COLUMNS TO c	ITEM NAME d	EXPLICIT INSTRUCTIONS e
1.	1	11	Old Task Number	Punch 11 numeric; no punctuation; left justify.
2.	12	12	Skip	Skip.
3.	13	23	New Task Number	Punch 11 numeric; no punctuation.
4.	24	77	Skip	Skip.
5.	78	79	Card-Id	Punch "T3."
6.	80	80	Action Code	Punch Alpha "T."

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